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10/611,507

06/30/2003

Michael E. Badding

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CORNING INCORPORATED
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EXAMINER

WALKER, KEITH D

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

02/25/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | | |
|------------------------------|------------------------|--|---------------------|--|
| Office Action Summary | Application No. | | Applicant(s) | |
| | 10/611,507 | | BADDING ET AL. | |
| | Examiner | | Art Unit | |
| | KEITH WALKER | | 1795 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-26 is/are pending in the application.
- 4a) Of the above claim(s) 1-9 and 17-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-15 and 23-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/10/07 has been entered.

Response to Amendment

Claims 1-15 & 17-26 are pending in the application and claims 1-9 and 16-22 are withdrawn. Claims 10-15 and 23-26 are pending examination as discussed below.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1795

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 10-12, 15 & 23-26 rejected under 35 U.S.C. 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US Patent Publication 2003/0180602 (Finn).

Finn teaches a solid oxide fuel cell with a textured electrolyte made with yttria-stabilized zirconia ceramic. One embodiment teaches an electrolyte having an average thickness of 20 – 10,000 microns and a surface texture of 5 – 1000 microns ([0195]). A predetermined re-producible pattern is used to texture the electrolyte sheet (Figs 13, 15, 16; [0186, 192]). The protrusions have a height of 5% of the average thickness, which can equate to a surface roughness of 2.5 microns ([0175]). The pattern is a sinusoidal pattern and as such, all the areas of the electrolyte that are not the peak area are thinner than the rest of the electrolyte sheet under the cathode or anode. The re-producible pattern is seen as product-by-process and as such even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process (MPEP 2113).

Regarding claim 10 & 23, since the electrolyte layer is made from the same material and has the same thickness and features as the claimed invention, it is

inherent that it has the same flexible property and an equivalent ohmic resistance as applicant.

Regarding claim 26, the electrolyte layer taught by Finn is made from the same material and the features are made by various chemical and mechanical methods. The thinner areas will have texture and therefore are textured.

Claim Rejections - 35 USC § 103

2. Claims 10-15 & 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Publication 2001/0044043 (Badding) in view of US Patent Publication 2003/0180602 (Finn).

The teachings of Finn as discussed above are incorporated herein.

Regarding claims 10-14, 16 & 23, Badding teaches a yttria-stabilized zirconia electrolyte for use in a solid oxide fuel cell ([0003] & [0004]). The electrolyte is flexible and has a thickness of 5-20 microns ([0042]). Possible doping oxides for the electrolyte are selected from the group of Y, Ce, Ca, Mg, Sc, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, In, Ti, Sn, Nb, Ta, Mo, and W and mixtures thereof ([0044]).

While Badding teaches using an interface layer to roughen the electrolyte layer, he is silent as to the thickness variations and the pre-determined pattern.

Finn teaches texturing the electrolyte by 5% of the average thickness or 0.5 – 2.5 microns. Using the 2.5 micron height, the thickness variation is 12.5 – 50% the average thickness of the Badding electrolyte. While the 5% is not within the claimed range, claims that differ from the prior art only by slightly different (non-overlapping) ranges are prima facie obvious without a showing that the claimed range achieves

Art Unit: 1795

unexpected results relative to the prior art (MPEP 2144.05). Claimed ranges of a result effective variable that do not overlap the prior art ranges are unpatentable unless they produce a new and unexpected result that is different in kind and not merely in degree from the results of the prior art (MPEP 2144.05). The pattern is a sinusoidal pattern and as such, all the areas of the electrolyte that are not the peak area are thinner than the rest of the electrolyte sheet under the cathode or anode. Regarding claim 26, the electrolyte layer taught by Finn is made from the same material and the features are made by various chemical and mechanical methods. The thinner areas will have texture and therefore are textured.

The motivation to use the texturing parameters of Finn is to improve adhesion and reduce the electrolyte/electrode resistance.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the electrolyte layer of Badding with the electrolyte roughening parameters taught by Finn to increase the adhesion between the electrolyte and electrode layers and reduce the resistance between the same layers, thereby improving the performance of the fuel cell.

3. Claims 13 & 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Publication 2003/0180602 (Finn).

The teachings of Finn as discussed above are incorporated herein.

Finn is silent to the electrolyte having an average thickness between 4 and 15 microns.

Finn teaches a solid oxide fuel cell with a textured electrolyte made with yttria-stabilized zirconia ceramic. The average thickness is taught to be 20 microns ([0195]). Claims that differ from the prior art only by slightly different (non-overlapping) ranges are prima facie obvious without a showing that the claimed range achieves unexpected results relative to the prior art (MPEP 2144.05). Claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result, which is different in kind and not merely in degree from the results of the prior art (MPEP 2144.05).

It would be obvious to one skilled in the art at the time of the invention to make a thinner electrolyte to reduce the overall thickness of the fuel cell. Furthermore, by making a thinner electrolyte, the resistance across the electrolyte layer is reduced, thereby improving the performance of the fuel cell.

Response to Arguments

Applicant's arguments filed 12/10/07 have been fully considered but they are not persuasive.

Applicant argues the flexibility of the electrolyte sheet is not an inherent characteristic because of factors like overall flatness, electrolyte sheet microstructure and size and frequency of inclusions. However, as stated above, the electrolytic sheet taught by the prior art meets all the factors of the claimed invention plus it is made with the same material. Flexibility is a characteristic of the sheet and as all the other limitations of the electrolyte sheet are met by the prior art; the flexibility of the electrolyte

Art Unit: 1795

sheet is inherently the same as claimed by the instant claims. Applicant has provided no evidence to the contrary.

Applicant argues since Badding already teaches one method of increasing adhesion and improve electrolyte/electrode resistance that the teachings of Finn cannot be used. Applicant has provided no evidence why one skilled in the art would not use the two teachings together to increase the adhesion strength of Badding by the method of Finn and decrease the electrolyte/electrode resistance of Badding with the teachings of Finn. The combination of the prior art cannot be discounted just because both references teach improving the same characteristics of an invention.

Applicant argues that it is not obvious that making the electrolyte of Finn thinner will not jeopardize the electrolyte's integrity and strength. First, applicant has provided no evidence that the integrity or strength of the Finn reference would be patentable distinct from the claimed invention. Second, the integrity and strength of the electrolytic sheet are not claimed. Third, the obvious rejection is based on reducing the thickness to improve the resistance of the electrolytic sheet and to decrease the thickness of the fuel cell.

Applicant argues Finn does not teach the limitations of claims 10-16 & 25 since the thickness variation of 6.6% to 90% and a minimum variation of 2 microns are not taught. From the math example laid out on page 6 of the arguments, it appears applicant is using the 5% variation taught by Finn as a variation across the whole thickness of the electrolyte, which for an electrolyte thickness of 30 microns would only produce a variation of 1.5 microns. However, the 5% roughness taught by Finn relates

Art Unit: 1795

to the protrusions on one surface of the electrolyte, "A textured surface" and "a surface roughness". Using the same example as explained by applicant, the 1.5 micron surface variation on the one side is also a 1.5 micron variation on the other side. So now the electrolyte has a total variation of 3 microns, which is 10% of the average electrolyte thickness. Therefore all the limitations are met and the prior art of Finn anticipates the claimed invention.

In response to applicant's argument that applicant's invention solving a different problem, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to [redacted] whose telephone number is (571)272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

K. Walker

/PATRICK RYAN/

Supervisory Patent Examiner, Art Unit 1795